Notice of Allowability	Application No.	Applicant(s)	
	09/500,380	KNAPP ET AL.	
	Examiner	Art Unit	
	Craig A. Renner	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *paper(s) filed 24 October 2005*.

2. ☒ The allowed claim(s) is/are *1,12,82,84-92,94-101,121,123-127,142-145,147-154 and 156-160 (renumbered 1,11,2-9,12-27,10 and 28-43, respectively)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), ~~Paper No./Mail Date _____~~.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Janyce R. Mitchell on 10 November 2005.

2. The application has been amended as follows:

IN THE CLAIMS:

The claim listing has been amended as follows:

1. (Previously Presented) A transducer comprising:

a plurality of solid layers, including a magnetically soft loop substantially encircling an electrically conductive coil section and terminating in lead and trailing magnetically soft layers separated by an amagnetic gap layer, said trailing magnetically soft layer being oriented substantially perpendicular to said amagnetic layer, wherein said trailing magnetically soft layer has a width measured in a direction substantially parallel to said amagnetic layer, said width being less than about two hundred nanometers and greater than about twenty angstroms;

wherein said trailing magnetically soft layer has a length measured in a direction substantially perpendicular to said amagnetic layer, with said length being at least six times greater than said width.

2-11. (Canceled).

12. (Currently Amended) A transducer for an information storage system, the transducer comprising:

a plurality of solid layers, including a magnetoresistive sensor layer and a magnetically soft loop substantially encircling an electrically conductive coil section and terminating adjacent a media-facing surface in leading and trailing magnetically soft layers separated by an amagnetic gap layer, said trailing magnetically soft layer being oriented substantially perpendicular to said magnetoresistive sensor layer and having a width measured in a direction substantially parallel to said magnetoresistive sensor

layer, said width being less than about two hundred nanometers and greater than about twenty ~~Angstroms~~ angstroms;

wherein said trailing magnetically soft layer has a length measured in a direction substantially perpendicular to said magnetoresistive sensor layer, with said length being at least six times greater than said width.

13-81. (Canceled).

82. (Previously Presented) The transducer of claim 1, wherein a distance between said magnetically soft layers is not substantially greater than said width.

83. (Canceled).

84. (Previously Presented) The transducer of claim 1, wherein said trailing magnetically soft layer contains a refractory metal.

85. (Previously Presented) The transducer of claim 1, wherein said trailing magnetically soft layer contains material having a B_s higher than that of Permalloy.

86. (Previously Presented) The transducer of claim 1, wherein said leading magnetically soft layer is substantially perpendicular to said trailing magnetically soft layer.

87. (Previously Presented) The transducer of claim 1, wherein said leading magnetically soft layer contains vacuum-deposited material.

88. (Previously Presented) The transducer of claim 1, further comprising a magnetoresistive sensor layer disposed adjacent said leading magnetically soft layer and oriented substantially perpendicular to said trailing magnetically soft layer.

89. (Previously Presented) The transducer of claim 1, wherein said magnetically soft loop includes a magnetically soft trailing yoke layer that adjoins said trailing magnetically soft layer.

90. (Previously Presented) The transducer of claim 89, wherein said trailing yoke layer extends further in said direction substantially parallel to said amagnetic layer than in a direction substantially perpendicular to said amagnetic layer and aligned with said leading and trailing magnetically soft layers.

91. (Previously Presented) The transducer of claim 12, wherein said trailing magnetically soft layer is substantially perpendicular to said amagnetic layer.

92. (Previously Presented) The transducer of claim 12, wherein said trailing magnetically soft layer is substantially perpendicular to said leading magnetically soft layer.

93. (Canceled).

94. (Previously Presented) The transducer of claim 12, wherein said trailing magnetic soft layer is laminated.

95. (Previously Presented) The transducer of claim 12, wherein said width of said trailing magnetically soft layer is not substantially greater than a thickness of said amagnetic layer.

96. (Previously Presented) The transducer of claim 12, wherein said trailing magnetically soft layer contains material having a B_s higher than that of Permalloy.

97. (Previously Presented) The transducer of claim 12, wherein said trailing magnetically soft layer contains a refractory metal.

98. (Previously Presented) The transducer of claim 12, wherein said trailing magnetically soft layer is sputter-deposited.

99. (Previously Presented) The transducer of claim 12, wherein said leading magnetically soft layer is sputter-deposited.

100. (Previously Presented) The transducer of claim 12, wherein said magnetically soft loop includes a magnetically soft trailing yoke layer that adjoins said trailing magnetically soft layer.

101. (Previously Presented) The transducer of claim 100, wherein said trailing yoke layer extends further in said direction substantially parallel to said magnetoresistive sensor layer than in a direction substantially perpendicular to said magnetoresistive sensor layer and aligned with said leading and trailing magnetically soft layers.

102-120. (Canceled).

121. (Previously Presented) A transducer comprising:

a magnetoresistive sensor layer,

a magnetically soft loop disposed adjacent to said magnetoresistive sensor layer, traversed by an electrically conductive coil section and including magnetically soft leading and trailing pole-tips disposed adjacent to a media-facing surface, said trailing pole-tip aligned with said magnetoresistive sensor layer along a longitudinal direction and having a width measured in a track-width direction that is perpendicular to said

longitudinal direction, said longitudinal and track-width directions being substantially parallel to said media-facing surface, said width being less than two hundred nanometers and greater than twenty angstroms;

wherein said trailing pole-tip has a length measured in said longitudinal direction, said length being at least five times greater than said width.

122. (Canceled).

123. (Previously Presented) The transducer of claim 121, wherein said leading and trailing pole-tips are separated by a submicron nonferromagnetic gap layer.

124. (Previously Presented) The transducer of claim 121, wherein said trailing pole-tip consists essentially of sputtered material.

125. (Previously Presented) The transducer of claim 121, wherein said trailing pole-tip contains material having a B_s higher than that of Permalloy.

126. (Previously Presented) The transducer of claim 121, wherein said leading magnetically soft loop includes a magnetically soft yoke layer adjoining said trailing pole-tip.

127. (Previously Presented) The transducer of claim 126, wherein said yoke layer extends further in said track-width direction than in said longitudinal direction.

128-141. (Canceled).

142. (Previously Presented) The transducer of claim 1, wherein said trailing magnetically soft layer is laminated.

143. (Previously Presented) The transducer of claim 121, wherein said trailing pole-tip is laminated.

144. (Previously Presented) A disk drive comprising:

a rigid magnetic disk, and

a magnetic head disposed adjacent to the disk, the head including a magnetically soft loop substantially encircling an electrically conductive coil section and terminating in leading and trailing magnetically soft layers separated by an amagnetic gap layer, one of said magnetically soft layers being oriented substantially perpendicular to said amagnetic layer, wherein said one magnetically soft layer has a width measured in a direction substantially parallel to said amagnetic layer, said width being less than about two hundred nanometers and greater than about twenty angstroms;

wherein said trailing magnetically soft layer has a length measured in a direction substantially perpendicular to said amagnetic layer, said length being at least six times greater than said width.

145. (Previously Presented) The disk drive of claim 144, wherein a distance between said magnetically soft layers is not substantially greater than said width.

146. (Canceled).

147. (Previously Presented) The disk drive of claim 144, wherein said trailing magnetically soft layer contains a refractory metal.

148. (Previously Presented) The disk drive of claim 144, wherein said trailing magnetically soft layer contains material having a B_s higher than that of Permalloy.

149. (Previously Presented) The disk drive of claim 144, wherein said leading magnetically soft layer is substantially perpendicular to said trailing magnetically soft layer.

150. (Previously Presented) The disk drive of claim 144, wherein said trailing magnetically soft layer contains vacuum-deposited material.

151. (Previously Presented) The disk drive of claim 144, further comprising a magnetoresistive sensor layer disposed adjacent said leading magnetically soft layer and oriented substantially perpendicular to said trailing magnetically soft layer.

152. (Previously Presented) The disk drive of claim 144, wherein said magnetically soft loop includes a magnetically soft trailing yoke layer that adjoins said trailing magnetically soft layer.

153. (Previously Presented) The disk drive of claim 144, wherein said trailing magnetically soft layer is laminated.

154. (Currently Amended) A disk drive comprising:

a rigid magnetic disk; and

an electromagnetic transducer disposed adjacent to said disk, the transducer including a magnetoresistive sensor layer, and a magnetically soft loop disposed adjacent to said magnetoresistive sensor layer, traversed by an electrically conductive coil section and including magnetically soft leading and trailing pole-tips disposed adjacent to a media-facing surface, said trailing pole-tip aligned with said magnetoresistive sensor layer along a longitudinal direction and having a width measured in a track-width direction that is perpendicular to said longitudinal direction, said longitudinal and track-width directions being substantially parallel to said media-

facing surface, with said width being ~~les~~ less than two hundred nanometers and greater than twenty angstroms;

wherein said trailing pole-tip ~~magnetically soft layer~~ has a length measured in ~~a direction substantially perpendicular to said amagnetic layer~~ said longitudinal direction, said length being at least ~~six~~ five times greater than said width.

155. (Canceled).

156. (Previously Presented) The disk drive of claim 154, wherein said leading and trailing pole-tips are separated by a submicron nonferromagnetic gap layer.

157. (Previously Presented) The disk drive of claim 154, wherein said trailing pole-tip consists essentially of sputtered material.

158. (Previously Presented) The disk drive of claim 154, wherein said trailing pole-tip contains material having a B_s higher than that of Permalloy.

159. (Previously Presented) The disk drive of claim 154, wherein said magnetically soft loop includes a magnetically soft yoke layer adjoining said trailing pole-tip.

160. (Previously Presented) The disk drive of claim 159, wherein said yoke layer extends further in said track-width direction than in said longitudinal direction.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (571) 272-7580. The examiner can normally be reached on Tuesday-Friday 9:00 AM - 7:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, A. L. Wellington can be reached on (571) 272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Craig A. Renner
Primary Examiner
Art Unit 2652

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